Comparison of two methods of numerical tracking of the soil contamination dynamics during a leak from a pipeline

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Abstract

© Published under licence by IOP Publishing Ltd. The situation of leakage of a polluting liquid from a longitudinal crack of the pipeline lying on the ground surface is considered. The two-dimensional nonstationary mathematical model is based on the mass balance equation in terms of pressure, which is satisfied in a domain with an unknown moving boundary. This area corresponds to the area of contaminated zone. A function characterizing the region of action of the equation is introduced, which makes it possible to obtain the formulation of the problem in a fixed domain. Two types of finite-difference approximation of the problem statement are proposed. They differ by approximation of the convective term. Counter-current approximation and approximation along characteristics are used. The results of computational experiments, which are in favor of using the method of characteristics, are presented. The methods application is illustrated by an example of spread of oil pollution.

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